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**Ethical considerations: Due to the nature of the study, the permission of the IRB was considered unnecessary.**

**Nosocomial infections in psychiatric hospitals during the new coronavirus pneumonia outbreak**

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**Abstract:** Since mid-December 2019, a new coronavirus pneumonia (NCP) has emerged in China. It was reported that Wuhan Mental Health Center in China was affected from the very beginning of the outbreak. Coincidentally, another large-scale nosocomial infection occurred at the psychiatric ward of the Daenam Hospital in South Korea. It is important for the policymakers to pay full attention on this aspect worldwide and corresponding prevention recommendations should be provided.

**Keywords:** Coronavirus; Pneumonia; Nosocomial infection

Since mid-December 2019, a new coronavirus pneumonia (NCP, also known as COVID-19) has emerged in China (Li et al., 2020). With the spread from the city of Wuhan, the outbreak of NCP has been reported to occur worldwide, especially in South Korea, Japan, and Italy. Based on the current situation, most patients have a good prognosis, but still with the death rate of 4.5 % (2 3914/52 9362--up to March 27 from the real-time big data reports). As an acute respiratory infectious disease, it has been included in the list of Class B infectious diseases stipulated in the Law of the People's Republic of China on the Prevention and Control of Infectious Diseases, and it has been managed as a Class A infectious disease(Zhu et al., 2020).

Nucleic acid testing of NCP was considered as the gold standard for confirmed diagnosis until February 12, 2020, which was initiated by the Chinese Government to better understand this disease. Then, the Hubei Provincial Health Commission updated a new standard of diagnosis based on the "Diagnosis and Treatment Program of New Coronavirus Pneumonia (the Fifth Revised Edition)", in which the clinical diagnosis was also added. Some suspected cases were also approved as confirmed cases upon imaging the characteristics of NCP. This diagnostic method combined with appropriate home quarantine has greatly enhanced the recognition and diagnosis. After this, the daily confirmed cases have continued to decline, and the number of patients has dropped below 100 for the first time on March 7. It is expected that this trend will continue but at a low level domestically.

On February 25, Zhu et al. (Zhu et al., 2020) reported the risk and prevention of NCP infections among inpatients in psychiatric hospitals. They analyzed nine different factors and detailed about the corresponding preventive measures for a large-scale nosocomial infection outbreak that occurred in the Wuhan Mental Health Center on February 8. It was reported that Wuhan Mental Health Center is the largest mental hospital in Hubei Province that was affected from the very beginning of the outbreak (Table 1).

However, the neighboring country South Korea is still undergoing the outbreak period when the outbreak in China has started to decline. Similar to the situation in China, there has been a delay of about 5 weeks compared to China since the first confirmed case of new coronavirus that was reported in this nation on January 20. Coincidentally, after about 3 weeks, the Washington Post disclosed that a large-scale nosocomial infection occurred at the Daenam Hospital in Cheongdo-Gun, Gyeongsangbuk-Do, South Korea on February 29. We have listed the most important events (with a timeline) from January 20 in Table 2.

### **Challenges and strategies**

From the perspective of nosocomial infections in the two above indicated hospitals, it is suspected that once the nosocomial infections started to occur, neither Chinese nor Korean psychiatric wards were able to respond rapidly. Even with China's early warning, the outbreak of nosocomial infections in the second psychiatric hospital still occurred due to the longer optimal period of quarantine. Therefore, prevention and control among psychotic patients is extremely difficult. However, there is still many similarities between the two. We tried to compare the similarities of the two events in different countries:

1. Adequate examination was not provided for outpatients and inpatients;
2. Admission to the hospital was not limited;
3. The patients with mental illness could not make a correct and timely assessment of their physical status and patients with NCP originally showed atypical clinical symptoms;
4. Inpatients did not receive correct and timely treatment when fever occurred;
5. The protection was not adequately made for medical staff;
6. Medical and nursing staff in psychiatric specialty lack knowledge in coping with infectious diseases;
7. Psychiatric ward is densely staffed, and thus lacks sufficient space for ventilation;
8. There are no satisfactory measures for diagnosis and treatment in psychiatric hospitals, and could not be sufficiently supported by the nearby Pulmonary Medicine Department;
9. Potential risks were associated with family visits;
10. Rapid arrangements could not be made against strict restrictions on discharge procedures during the epidemic.

We could figure out that the hazard is similar and serious that was caused by the same hospitalized population. When the first case was confirmed, many inpatients had

already been in the incubation period in the hospitals. At that time, the outbreak was already in an out of control condition. It was reported that the longest incubation period is 24 days(Chang et al., 2020). Therefore, we need to understand that prevention is the most emergent way to tackle this disease(ChineseSocietyofPsychiatry, 2020). In response to the above ten points, we were then able to list the corresponding prevention recommendations:

1. Improve the corresponding examination of patients to prevent the risk from the admission of suspected patients, and body temperature, blood routine examination and imaging examinations (chest CT ) should be applied;
2. Set up an observation room and a 14-day clinical observation period;
3. Ensure that special medical staff is available and is responsible for coping with daily assessment of the physical health of patients with mental illness;
4. Recommend that all of the patients in the ward should be tested if a suspected patient is recognized;
5. Conduct necessary screening and protection for medical and nursing staff, such as N95 mask and isolation gown;
6. Strengthen the training of the medical staff in mental hospitals;
7. Reduce the density of staff through discharging procedure as soon as possible before the outbreak;
8. Pre-arrange the planning of transferring the suspected patients to the nearby Pulmonary Medicine Department;
9. Prohibit visits of the family members and work of the non-medical personnel;
10. Connect with CDC to impose temporary exemption procedure for discharging against NCP, as the primary consideration.

## Perspectives

This short communication is mainly to bring it into the notice of the uninfected countries and regions to make adequate plans to overcome the emergency situations that they might face, especially in the Psychiatric department (Jiang et al., 2020) of their hospitals. On the other hand, it should also remind them that the risks they might face in the confined environments are much higher than those in communities, such as psychiatric ward, nursing home, prison, collective dormitory, cruise ship, and others. Many outbreaks of NCP have been reported in these kinds of confined place, and it is important for the policymakers to pay full attention on this aspect worldwide.

### **Author contributions**

HJ and LL wrote the manuscript. TH collaborated in the writing and editing of the manuscript. YZ proofread the manuscript. All the authors contributed to the reviewing of the final version of the manuscript.

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### **Declaration of competing interests**

The authors have no conflicts of interest to declare.

**Table 1. Important events of NCP infections at Wuhan Mental Health Center**

From the mid- December 2019	Date	Events
~ 4 weeks	January 12	More than 10 inpatients got a fever, who were diagnosed with common cold with not enough attention at that time.
~ 5 weeks	January 20	The first case was diagnosed with NCP.
~ 6 weeks	January 24	More than 20 patients had fever, and at least 50 cases were diagnosed with NCP.
~ 8 weeks	February 8	~50 patients and 30 medical staff in WMHC were diagnosed with NCP <sup>a</sup> .

Note: This information was exclusively reported by China News Weekly, which may have other uncertain approaches.

**Table 2. Important events of NCP infections at Daenam Hospital**

From	Date	Events
January 20		
~ 3 weeks	February 11	The first inpatient got a fever in the psychiatric ward.
~ 4 weeks	February 15	Many of the inpatients got a fever in the psychiatric ward.
~ 5 weeks	February 19	The first dead occurred, brought to the attention of the hospital.
~ 5 weeks	February 21	The first dead was diagnosed with NCP.
~6 weeks	February 29	101 patients from this psychiatric ward were diagnosed with NCP, almost all inpatients confirmed.
~7 weeks	March 2	119 patients from this hospital were diagnosed with NCP, 7 dead confirmed.

Note: This information was reported by Washington Post, which may have other uncertain approaches.

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